PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Assistant Commissioner for Patents
United States Patent and Trademark Office
Box PCT
Washington, D.C.20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 30 March 2000 (30.03.00)	
International application No. PCT/GB99/02669	**Applicant's or agent's file reference** PLB/CC/Q417
International filing date (day/month/year) 12 August 1999 (12.08.99)	**Priority date** (day/month/year) 20 August 1998 (20.08.98)
Applicant ABDULHAYOGLU, Melih	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International Preliminary Examining Authority on:

19 February 2000 (19.02.00)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

[ ] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO **34, chemin des Colombettes** **1211 Geneva 20, Switzerland**	Authorized officer Pascal Piriou
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

REC'D 17 OCT 2000
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
PLB/JE/Q417		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB99/02669	12/08/1999	20/08/1998
International Patent Classification (IPC) or national classification and IPC		
G06F1/00		
Applicant		
COMODO TECHNOLOGY DEVELOPMENT LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☒ Certain defects in the international application
   - VIII ☒ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
19/02/2000	13.10.2000
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Dixon-Hundertpfund K Telephone No. +49 89 2399 2857

Form PCT/IPEA/409 (cover sheet) (January 1994)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB99/02669

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

1-9 as originally filed

Claims, No.:

1-20 as originally filed

Drawings, sheets:

1/1 as originally filed

2. The amendments have resulted in the cancellation of:

☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-20(yes)
	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-20 (no)
Industrial applicability (IA)	Yes:	Claims	1-20 (yes)
	No:	Claims	

2. Citations and explanations

see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

V. Reasoned statement with regard to novelty, inventive step or industrial applicability

1. The subject-matter of Claims 1 and 11 does not involve an inventive step, and therefore does not satisfy the criterion set forth in Article 33(3) PCT.

2. Reference is made to the following documents:

D1: US 5 355 414 A (HALE ROBERT P ET AL) 11 October 1994 (1994-10-11)
D2: EP 0 549 511 A (IBM) 30 June 1993 (1993-06-30)
D3: WO 97 46931 A (CKD SA ;DAPSANCE PIERRE (FR)) 11 December 1997 (1997-12-11)
D4: WO 95 26085 A (CLARK DERECK B ;INNOVONICS INC (US)) 28 September 1995 (1995-09-28)

3. Document D1, which is considered to represent the most relevant state of the art, discloses a data processing device (and corresponding method), said data processing device comprising a first input channel (keyboard 130 or mouse 140 in D1) and a second input channel, and a security device (120, see column 3, lines 15-26; column 4, lines 15-17 in D1) for verifying a password from the first input channel.

D1 is silent about how signals from the second input channel (for e.g. a data socket) are dealt with.

D2 (see in particular column 1, line 1 to column 3, line 52) discloses a security device (security mechanism 43 in D2) which is configured to receive signals from a first input channel (secured input device, such as keyboard 19) but not from a second input channel (non-secured input devices), so that D2 teaches a skilled person to configure the security device to not receive signals from the second input channel. Therefore, the subject-matter of claims 1 and 11 is not inventive in the light of the disclosures of D1 and D2.

4. D3 discloses a housing branched between a keyboard and a CPU, this housing containing an electronic circuit capable of verifying access authorisation and of

modifying the connexion status between the keyboard and the CPU.

D4 discloses an encryption module for encrypting sensitive data which is interposed in series between a computer and a keyboard.

Dependent Claims 2-10 and 12-20 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, involve an inventive step because they are either known from the prior art D1 to D4 or they define features which are a matter of normal design procedure for the skilled person.

VII. Certain defects in the international application

1. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1, D2, D3 and D4 is not mentioned in the description, nor are these documents identified therein.

2. The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

3. The claims are not drafted in the two-part form as required by Rule 6.3(b) PCT.

VIII. Certain observations on the international application

1. The claim formulation of the type "In a data processing apparatus ... a security device..." (claim 1) does not meet the requirement of Article 6 PCT in that it is unclear whether the claims is directed to the data processing apparatus or merely to the features relating specifically to the security device.

PATENT COOPERATION TREATY

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION** see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
PLB/CC/Q417		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/GB 99/ 02669	12/08/1999	20/08/1998
Applicant		
COMODO TECHNOLOGY DEVELOPMENT LIMITED et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language,** the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   [ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

   b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

   [ ] contained in the international application in written form.

   [ ] filed together with the international application in computer readable form.

   [ ] furnished subsequently to this Authority in written form.

   [ ] furnished subsequently to this Authority in computer readble form.

   [ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   [ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of invention is lacking** (see Box II).

4. With regard to the **title,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. 1

   [X] as suggested by the applicant.

   [ ] because the applicant failed to suggest a figure.

   [ ] because this figure better characterizes the invention.

   [ ] None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 99/02669

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G06F1/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 549 511 A (IBM) 30 June 1993 (1993-06-30) abstract; figures 1,4 column 1, line 1 -column 2, last line	1,4,5, 11,12,17
Y	column 4, line 22 - line 29 claims 1-8	2,3,6-8, 14,16, 18-20
A	---	9,10,13, 15
Y	US 5 355 414 A (HALE ROBERT P ET AL) 11 October 1994 (1994-10-11) column 2, line 1 -column 4, line 55 column 6, line 49 - line 59	2,3,6-8, 14,16, 18-20
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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25 November 1999	02/12/1999

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Powell, D

1

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 99/02669

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
A	WO 97 46931 A (CKD SA ;DAPSANCE PIERRE (FR)) 11 December 1997 (1997-12-11)	
A	WO 95 26085 A (CLARK DERECK B ;INNOVONICS INC (US)) 28 September 1995 (1995-09-28)	

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/GB 99/02669

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0549511 A	30-06-1993	US 5664097 A	02-09-1997
		JP 5233087 A	10-09-1993
US 5355414 A	11-10-1994	NONE	
WO 9746931 A	11-12-1997	FR 2749680 A	12-12-1997
WO 9526085 A	28-09-1995	US 5517569 A	14-05-1996
		AU 691602 B	21-05-1998
		AU 2190295 A	09-10-1995
		BR 9507114 A	02-09-1997
		CA 2185697 A	28-09-1995
		EP 0750812 A	02-01-1997
		JP 10500504 T	13-01-1998
		NZ 283566 A	19-12-1997
		US 5815577 A	29-09-1998

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 99/02669

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Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

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Name and mailing address of the ISA	Authorized officer
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Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 99/02669

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT

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International Application No
PCT/GB 99/02669

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		JP 5233087 A	10-09-1993
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		AU 2190295 A	09-10-1995
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		CA 2185697 A	28-09-1995
		EP 0750812 A	02-01-1997
		JP 10500504 T	13-01-1998
		NZ 283566 A	19-12-1997
		US 5815577 A	29-09-1998

INTERNATIONAL SEARCH REPORT

Inter ›nal Application No
PCT/GB 99/02669

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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25 November 1999	02/12/1999

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Powell, D

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Inter onal Application No
PCT/GB 99/02669

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

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Inter ...nal Application No
PCT/GB 99/02669

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EP 0549511 A	30-06-1993	US 5664097 A	02-09-1997
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US 5355414 A	11-10-1994	NONE	
WO 9746931 A	11-12-1997	FR 2749680 A	12-12-1997
WO 9526085 A	28-09-1995	US 5517569 A	14-05-1996
		AU 691602 B	21-05-1998
		AU 2190295 A	09-10-1995
		BR 9507114 A	02-09-1997
		CA 2185697 A	28-09-1995
		EP 0750812 A	02-01-1997
		JP 10500504 T	13-01-1998
		NZ 283566 A	19-12-1997
		US 5815577 A	29-09-1998

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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : G06F 1/00 — A1

(11) International Publication Number: WO 00/11535

(43) International Publication Date: 2 March 2000 (02.03.00)

(21) International Application Number: PCT/GB99/02669

(22) International Filing Date: 12 August 1999 (12.08.99)

(30) Priority Data:
9818184.5 20 August 1998 (20.08.98) GB

(71) Applicant *(for all designated States except US)*: COMODO TECHNOLOGY DEVELOPMENT LIMITED [GB/GB]; 10 Hey Street, Bradford, West Yorkshire BD7 1DQ (GB).

(72) Inventor; and

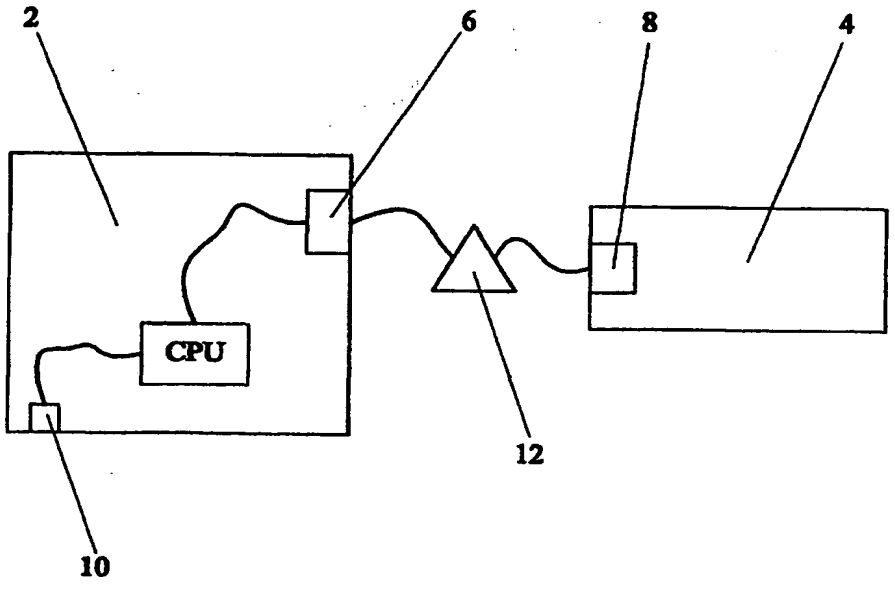
(75) Inventor/Applicant *(for US only)*: ABDULHAYOGLU, Melih [TR/GB]; 10 Hey Street, Bradford, West Yorkshire BD7 1DQ (GB).

(74) Agents: BRANDON, Paul, Laurence et al.; Appleyard Lees, 15 Clare Road, Halifax, West Yorkshire HX1 2HY (GB).

(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
With international search report.

(54) Title: IMPROVEMENTS IN AND RELATING TO DATA PROCESSING APPARATUS AND VERIFICATION METHODS



(57) Abstract

The present invention provides in a data processing apparatus comprising a first input channel (4) and a second input channel (10) each for inputting signals, a security device (12) for verifying a password, and means (12) for determining whether the password input to the security device comes from the second input channel, in which the security device will verify a correct password from the first input channel, but not from the second input channel, in which the security device is configured to receive signals from the first input channel and configured not to receive signals from the second input channel. A corresponding method is also provided.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	**ES**	Spain	**LS**	Lesotho	**SI**	Slovenia
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CU	Cuba	**KZ**	Kazakstan	**RO**	Romania		
CZ	Czech Republic	**LC**	Saint Lucia	**RU**	Russian Federation		
DE	Germany	**LI**	Liechtenstein	**SD**	Sudan		
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IMPROVEMENTS IN AND RELATING TO DATA PROCESSING APPARATUS AND VERIFICATION METHODS

Field of the Invention

The present invention relates to data processing apparatus and to verification methods.

Background to the Invention

Despite the growing proliferation of computer hardware and software, there are still serious problems associated with data entry, and with the security of both hardware and software. Many new problems have arisen and others have become exacerbated as more and more computers are networked together and linked to the internet. One particular problem is that of remote hacking in which an unauthorised user seeks access to a computer or computer network by accessing the computer or a computer on the network otherwise than though a local keyboard or other local peripheral input device.

The present invention aims to provide in preferred embodiments thereof, data processing apparatus and verification methods that address at least one of these problems.

Summary of the Invention

According to the present invention in a first aspect, there is provided in a data processing apparatus comprising a first input channel and a second input channel each for inputting signals, a security device for verifying a

password, and means for determining whether the password input to the security device comes from the second input channel, in which the security device will verify a correct password from the first input channel, but not from the second input channel, in which the security device is configured to receive signals from the first input channel and configured not to receive signals from the second input channel.

In this way, the device determines whether the password input thereto comes from the second input channel, ie it physically cannot come from this channel.

Suitably, the device receives signals only from the first input channel. Suitably, the device cannot receive signals from the second input channel.

Suitably, the apparatus further comprises means to determine whether the security device has verified the password and, if not, to vary operation of the apparatus. Normally, the variation will be a restriction in operation, typically it will render the apparatus unusable.

Suitably, the first input channel comprises a first peripheral input device. Suitably, the first peripheral input device comprises a keyboard and the security device is located to receive signals from the keyboard and transmit them to a keyboard controller or to a bus. Suitably, the device is located between the keyboard controller and the keyboard bus. Here, "between" is in the electronic sense, ie receives output from the keyboard controller and generates an input for the keyboard bus.

The device thus acts as an interface between the keyboard controller and the bus.

Suitably, the apparatus further comprises a control unit (such as a CPU) which interrogates the security device to determine whether a correct password has been entered. A password protected operation is performed only if the control unit receives such verification.

Suitably, the device encrypts all signals it receives. Suitably, a decryption tool is provided between the output of the device and the application to which they key presses comprise instructions.

According to the present invention in a second aspect, there is provided a method of verifying which of a first input channel and a second input channel is used in data processing apparatus, the method comprising the steps of upon input of a password to the apparatus, a security device receiving input from the first input channel not from the second input channel declining password authorisation, if the input is through the second input channel, and if the correct password is input through the first input channel providing a password verification.

Suitably, the method includes the step of determining whether the security device has verified the password and, if not, varying the operation of the apparatus. Normally, the variation will be a restriction in operation. Typically, it will render the apparatus unusable.

Suitably, a control unit (such as a CPU) interrogates the security device to determine whether the correct password has been entered.

Suitably, the method includes the step of receiving signals only from the first input channel. Suitably, the data processing apparatus includes a device for receiving signals. Suitably, the device cannot receive signals from the second input channel.

Suitably, the first input channel comprises a first peripheral input device. Suitably, the first peripheral input device comprises a keyboard and the security device is located to receive signals from the keyboard and transmit them to a keyboard controller or to a bus. Suitably, the device is located between the keyboard controller and the keyboard bus. Here, "between" is in the electronic sense, ie receives output from the keyboard controller and generates an input for the keyboard bus. The device thus acts as an interface between the keyboard controller and the bus.

Suitably, the apparatus further comprises a control unit (such as a CPU) which interrogates the security device to determine whether a correct password has been entered. A password protected operation is performed only if the control unit receives such verification.

Brief Description of the Figure

The present invention will now be described, by way of example only, with reference to the Figure that follows

which is a schematic illustration of an electronic data processing apparatus embodying the present invention.

Description of the Preferred Embodiments

In one preferred embodiment of the present invention, there is provided an electronic data processing apparatus, typically a personal computer ("PC") 2. The PC 2 receives input signals from peripheral input devices (eg keyboard, data socket, pen, voice recognition microphone etc). The PC includes a keyboard 4 having an associated bus 6 and a keyboard controller 8 forming a first input channel from the keyboard 4. The PC 2 also has at least one further input channel 10 for signals corresponding to those from the keyboard 4. Typically, this further input channel 10 will comprise a data socket for receipt of digital signals transmitted from a remote modem (not shown). The PC 2 generally treats signals received via the data socket in the same way as those received from the keyboard 4, except as set out below.

A security device 12 is located between the keyboard controller 8 and the bus 6. That is, the security device 12 is located to receive signals from the first input channel (the keyboard 4), but not from the further input channel (the data socket 10). The security device 12 has the following characteristics.

(i) It includes a fast and reversible encryption/decryption algorithm such as DES or T-code.

(ii) It has a volatile memory Random Access Memory (RAM) including authorisation codes or an algorithm therefor, or pre-stored password and means for checking whether an input password or code matches such an authorisation code or password.

(iii) It includes a real-time clock powered by a power supply.

The security device 12 is typically embodied in a board (not shown) including a microprocessor. The board may be integral to the PC 2 or be a separate plug-in board.

The security device 12 requires a password to be input to pass keyboard signals to the bus 8. If the password is not provided on demand (a limited number of tries may be permitted before a lock-out) the security device 12 will either block signals or vary them, for instance by encryption, to be unusable. The security device 12 is configured so that upon receipt of the correct password it is activated for a predetermined period of time, according to the in-built real-time clock. The period of time can be varied based upon the password or other authorisation received. While activated, the security device 12 transmits keyboard signals unaltered. When not activated it is in the encryption state and encrypts signals passing therethrough (or may block them). Thus, while in the encryption state the central processing unit ("CPU") of PC 2 cannot understand the output of keyboard 8.

The security device 12 when activated and authorised receives input signals from the keyboard bus and outputs

them to the keyboard controller. The delay is insignificant.

In use, the PC 2 is configured to require a password before permitting access to certain functions or data (which may be all functions and/or data). By way of example, a word-processing file may be password protected. Before permitting access to the file, the PC CPU requires confirmation from the security device 12 that the correct password has been entered. Only if the CPU receives verification from the security device that the correct password has been entered will it perform the password protected operation. Since the security device 12 can only receive inputs from the keyboard, it is not possible to enter the password from any other source.

In this way, it is possible to verify the physical presence of a user. If signals are input to the PC via a modem, for instance from a "hacker", it will not be received via the keyboard input channel and so the password cannot be verified. Thus access can be denied to remote users or additional security measures put in place before allowing them access.

Typically, data will be encrypted and decryption will only be permitted upon verification from the security device 12.

Preferred embodiments of the present invention also enable a security enhancement to be provided to prevent "key logging" attacks. This is where a hacker loads a short application on to a PC to be attached which application interrogates the operating system to determine

each keystroke as it is pressed. A record of keystrokes can be used to inspect confidential information and/or retrieve passwords.

To prevent this the security device 12 can be set to encrypt all key presses according to a predetermined encryption algorithm. An encryption algorithm is used to ensure that generally a given key press when repeated does not generate as an output from the security device 12 the same output. A tool is additionally provided between the operating system and the application to be controlled by the key presses to decrypt the encrypted key press data. Therefore since the key press information available to the operating system is encrypted it is of no use to a key logger.

Although reference is made herein to a "password", that can comprise any signal or combination of signals and need not be a "word" at all.

Clearly, in certain embodiments the apparatus may only verify input from other inputs, usually being peripheral input devices.

The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

All of the features disclosed in this specification (including any accompanying claims, abstract and drawings),

and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

Claims

1. In a data processing apparatus comprising a first input channel and a second input channel each for inputting signals, a security device for verifying a password, and means for determining whether the password input to the security device comes from the second input channel, in which the security device will verify a correct password from the first input channel, but not from the second input channel, in which the security device is configured to receive signals from the first input channel and configured not to receive signals from the second input channel.

2. A data processing apparatus according to claim 1, in which the device receives signals only from the first input channel.

3. A data processing apparatus according to claim 1 or claim 2, in which the device cannot receive signals from the second input channel.

4. A data processing apparatus according to any preceding claim, in which the apparatus further comprises means to determine whether the security device has verified the password and, if not, to vary operation of the apparatus.

5. A data processing apparatus according to any preceding claim, in which the first input channel comprises a first peripheral input device.

6. A data processing apparatus according to claim 5, in which the first peripheral input device comprises a keyboard and the security device is located to receive

signals from the keyboard and transmit them to a keyboard controller or to a bus.

7. A data processing apparatus according to claim 5 or claim 6, in which the device is located between the keyboard controller and the keyboard bus.

8. A data processing apparatus according to any preceding claim, in which the apparatus further comprises a control unit (such as a CPU) which interrogates the security device to determine whether a correct password has been entered.

9. A data processing apparatus according to any preceding claim, in which the device encrypts all signals it receives.

10. A data processing apparatus according to claim 9, in which a decryption tool is provided between the output of the device and the application to which they key presses comprise instructions.

11. A method of verifying which of a first input channel and a second input channel is used in data processing apparatus, the method comprising the steps of upon input of a password to the apparatus, a security device receiving input from the first input channel not from the second input channel declining password authorisation, if the input is through the second input channel, and if the correct password is input through the first input channel providing a password verification.

12. A method according to claim 11, in which the method includes the step of determining whether the security

device has verified the password and, if not, varying the operation of the apparatus.

13. A method according to claim 12, in which a control unit (such as a CPU) interrogates the security device to determine whether the correct password has been entered.

14. A method according to any one of claims 11 to 13, in which the method includes the step of receiving signals only from the first input channel.

15. A method according to claim 14, in which the data processing apparatus includes a device for receiving signals.

16. A method according to claim 14 or claim 15, in which the device cannot receive signals from the second input channel.

17. A method according to any one of claims 11 to 16, in which the first input channel comprises a first peripheral input device.

18. A method according to claim 17, in which the first peripheral input device comprises a keyboard and the security device is located to receive signals from the keyboard and transmit them to a keyboard controller or to a bus.

19. A method according to claim 17 or claim 18, in which the device is located between the keyboard controller and the keyboard bus.

20. A method according to any one of claims 11 to 19, in which the apparatus further comprises a control unit (such as a CPU) which interrogates the security device to determine whether a correct password has been entered.

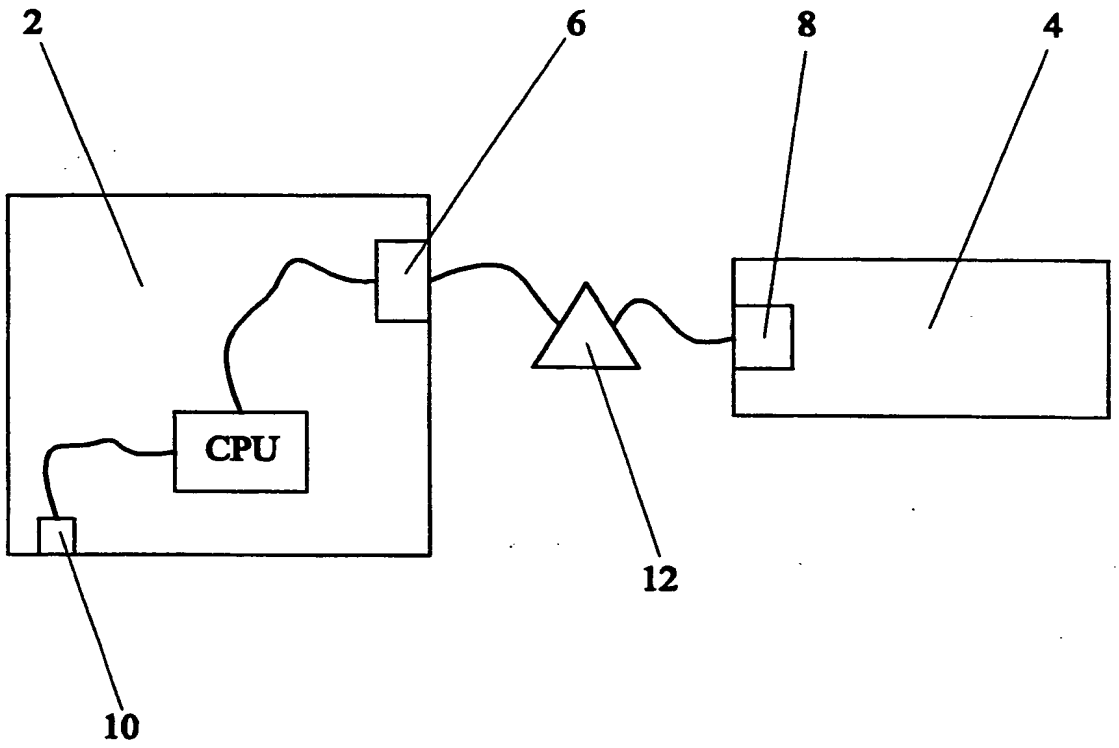

FIG. 1

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G06F1/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 549 511 A (IBM) 30 June 1993 (1993-06-30) abstract; figures 1,4 column 1, line 1 -column 2, last line	1,4,5, 11,12,17
Y	column 4, line 22 - line 29 claims 1-8	2,3,6-8, 14,16, 18-20
A	---	9,10,13, 15
Y	US 5 355 414 A (HALE ROBERT P ET AL) 11 October 1994 (1994-10-11) column 2, line 1 -column 4, line 55 column 6, line 49 - line 59	2,3,6-8, 14,16, 18-20
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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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"A" document defining the general state of the art which is not considered to be of particular relevance

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Date of the actual completion of the international search	Date of mailing of the international search report
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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